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IS 12585 (1988): Thermoplastic Hoses (Textile Reinforced) for Water - General Purpose [PCD 13: Rubber and Rubber Products]



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“Knowledge is such a treasure which cannot be stolen”



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*Indian Standard*

**SPECIFICATION FOR THERMOPLASTIC HOSES  
( TEXTILE REINFORCED )  
FOR WATER — GENERAL PURPOSE**

( First Reprint NOVEMBER 1996 )

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**BUREAU OF INDIAN STANDARDS  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002**

**AMENDMENT NO. 1 SEPTEMBER 2003**  
**TO**  
**IS 12585 : 1988 SPECIFICATION FOR**  
**THERMOPLASTIC HOSES (TEXTILE REINFORCED)**  
**FOR WATER — GENERAL PURPOSE**

( Page 2, clause 4.3.2 ) — substitute the following for the existing:

**'4.3.2 Adhesion** — When determined in accordance with IS 3400 ( Part 24 ) : 2001/ISO 8033 : 1991, the adhesion between lining and cover shall not be less than 1.4kN/m.'

( PCD 13 )

Reprography Unit, BIS, New Delhi, India

*Indian Standard*

# SPECIFICATION FOR THERMOPLASTIC HOSES ( TEXTILE REINFORCED ) FOR WATER — GENERAL PURPOSE

## 0. FOREWORD

**0.1** This Indian Standard was adopted by the Bureau of Indian Standards on 5 December 1988, after the draft finalized by the Rubber Products Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

**0.2** Due to growing manufacture and usage of thermoplastic hoses in the developed countries, they are also being used in India and consequently some manufacturers have also started producing them. Depending upon the usage, both rubber and plastics hoses have their comparative advantages and weak points. However, once the choice to use thermoplastic hose has been exercised, it is important to stipulate the parameters to be tested and also prescribe the most acceptable requirements. Taking cognizance of these changes and developments, this standard has been formulated. Standard for rubber water hoses (IS : 444-1987\*) has already been published which prescribes requirements,

methods of sampling and test for rubber water hose suitable for working pressure up to 2.5 MPa.

**0.3** In preparation of this standard assistance has been derived from ISO 6224-1981 'Plastics hoses — Textile — Reinforced thermoplastics type for water — Specification', issued by the International Organization for Standardization.

**0.4** The standard contains clauses 4.1.3, 4.2.1 and A-4.1.6 which call for an agreement between the purchaser and the supplier.

**0.5** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

\*General purpose rubber water hose (fourth revision).

\*Rules for rounding off numerical values (revised).

## 1. SCOPE

**1.1** This standard prescribes requirements, methods of sampling and test for general purpose thermoplastics water hoses with textile reinforcement suitable for working pressure up to 2.5 MPa and up to a maximum temperature of +55°C.

## 2. TERMINOLOGY

**2.1** For the purpose of this standard the definitions given in various parts of IS : 7503\* shall apply.

## 3. TYPES

**3.1** This standard covers following three types of hoses:

*Type 1* — For a working pressure of 0.6 MPa,

*Type 2* — For a working pressure of 1.0 MPa, and

*Type 3* — For a working pressure of 2.5 MPa.

## 4. REQUIREMENTS

**4.1 Construction** — The hose shall be as uniform as commercially practicable in colour, opacity and other physical properties and shall consist of the following:

**4.1.1 Lining** — A flexible thermoplastics

lining, smooth in bore.

**4.1.2 Reinforcement** — A natural or synthetic textile reinforcement.

**4.1.3 Cover** — A flexible thermoplastics cover, which may have a smooth or fluted finish as agreed to between the purchaser and the supplier. The colour may be different from that of the lining.

**NOTE** — The cover and lining shall be fully gelled and free from visible cracks, porosity, foreign inclusions or other defects which might affect serviceability.

## 4.2 Dimensions and Tolerances

**4.2.1 Bore Size** — The bore size when measured according to the method prescribed in 4.2.1.2 of IS : 443-1975\* shall be as given in Table 1. Other sizes within this range may be supplied by agreement between the purchaser and the supplier. The tolerances for these shall be those of the previous smaller size.

**4.2.2 Lining and Cover Thickness** — The thickness of the lining and cover of the hose, when measured according to the method prescribed in 4.2.2 of IS : 443-1975\*, shall be not less than that specified in Table 1.

\*Methods of sampling and test for rubber hoses (second revision).

\*Glossary of terms used in rubber industry.

**TABLE 1 BORE SIZES AND TOLERANCES AND MINIMUM THICKNESS OF LINING AND COVER**  
( Clauses 4.2.1 and 4.2.2 )

Sl No.	NOMINAL BORE	TOLERANCE ON NOMINAL BORE SIZE	MINIMUM THICKNESS OF LINING	MINIMUM THICKNESS OF COVER	
				Types 1 and 2	Type 3
(1)	(2) mm	(3) mm	(4) mm	(5) mm	(6) mm
i)	10.00	± 0.75	1.50	1.00	1.50
ii)	12.50	± 0.75	1.50	1.00	1.50
iii)	16.00	± 0.75	1.50	1.00	1.50
iv)	20.00	± 0.75	1.50	1.00	1.50
v)	25.00	± 1.25	2.00	1.00	—
vi)	31.50	± 1.25	2.00	1.00	—
vii)	38.00	± 1.50	2.00	1.00	—
viii)	50.00	± 1.50	2.50	1.00	—

**4.2.3** The tolerance on any hose length shall be  $\pm 1$  percent.

### 4.3 Physical and Performance Requirements

**4.3.1 Loss in Mass on Heating** — Samples of lining and cover, when tested in accordance with method prescribed in Appendix A, shall not show a loss in mass greater than 4 percent.

**4.3.2 Adhesion** — When tested in accordance with the method prescribed in IS : 3400 (Part 5)-1986\* the minimum adhesion value between the lining and reinforcement, and between reinforcement and cover, shall not be less than 1.4 kN/m.

**4.3.3 Pressure Requirements** — When tested in accordance with the method prescribed in 8 of IS : 443-1975†, the hose shall comply with the requirements given in Table 2 and shall show no leakage, porosity, rupture or other signs of failure.

**TABLE 2 PRESSURE REQUIREMENTS**

Sl No.	TYPE	PROOF PRESSURE	MINIMUM BURSTING PRESSURE
(1)	(2)	(3) MPa*	(4) MPa*
i)	1	0.96	1.90
ii)	2	1.60	3.15
iii)	3	5.00	10.00

\*1 MPa = 10.2 Kg/Cm<sup>2</sup>

**4.3.4 Minimum Bend Radius** — When tested by the Method A specified in IS 12656 : 1989‡ using a minimum radius of curvature of five times the nominal bore size, the hose shall show no signs of collapse.

**4.3.5 Low Temperature Flexibility** — When tested by the method specified in IS 12657 : 1989§ at  $-10 \pm 1^\circ\text{C}$  the hose shall be capable

\*Methods of test for vulcanized rubbers : Part 5 Adhesion of rubber to textile fabrics ( *second revision* ).

†Methods of sampling and test for rubber hoses ( *second revision* ).

‡Rubber and plastics hoses — Bending test ( *adoption of ISO 1746 : 1983* ).

§Rubber and plastics hoses — Sub-ambient temperature flexibility tests ( *adoption of ISO 4672 : 1988* ).

of being bent to a radius of 10 times the nominal bore size without kinking or any sign of cracking, and with a maximum increase in stiffness of 15 times.

## 5. MARKING

**5.1** Each length of hose shall bear the following information:

- Manufacturer's name or trade-mark,
- Hose type,
- Nominal bore size,
- Design working pressure, and
- Quarter and year of manufacture.

**5.1.1** For long length, the above markings shall be made at intervals of approximately 10 metres.

**5.1.2** Each length of hose may also be marked with the Standard Mark.

**NOTE** — The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control, which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

## 6. SAMPLING AND CRITERIA FOR CONFORMITY

**6.1** For the purpose of ascertaining the conformity of the hose in a consignment to this specification, the scale of sampling and the criteria for conformity shall be as prescribed in 3 of IS : 443-1975\*.

\*Methods of sampling and test for rubber hoses ( *second revision* ).

## APPENDIX A

( Clause 4.3.1 )

## DETERMINATION OF LOSS IN MASS ON HEATING\*

**A-0. PRINCIPLE**

**A-0.1** Test specimens are heated under defined conditions of time and temperature, in the presence of activated carbon and loss of mass from material is reported as loss of plasticizer from the material under test.

**A-1. APPARATUS AND MATERIALS**

**A-1.1 Analytical Balance** — Accurate to 0.001 g.

**A-1.2 Micrometer** — Accurate to 0.01 mm.

**A-1.3 Thermostatical Bath or Oven** — Capable of maintaining the temperature to within  $\pm 1^\circ\text{C}$  of the test temperature, in the range of 50 to  $150^\circ\text{C}$ .

**A-1.4 Containers** — Metal cans, or cylindrical form, about 100 mm in diameter and 120 mm in height provided with non-air tight cover; a lid with a small vent hose of 3 mm diameter may be suitable.

**A-1.5 Cylindrical Metal Cages** — Constructed from bronze gauze having apertures of approximately 500  $\mu\text{m}$ , with a diameter of 60 mm and a height of 6 mm, formed by soldering a strip of the gauze at right angles to the periphery of a disk of the gauze a similar but slightly larger cylinder acts as a lid.

**A-1.6 Activated Carbon** — With a grain size of about 4 to 6 mm, free from powder. The carbon shall be of a well determined type and grade, in order to obtain concordant results.

Before use the carbon should be sieved and dried to constant mass at  $70^\circ\text{C}$ , preferably under vacuum and then stored in an air tight container. Use fresh material for each test.

**A-2. TEST SPECIMENS**

**A-2.1** The test specimen shall be annular rings with height of 5 mm from hose sample.

**A-2.2** At least three test specimens shall be tested for each material.

**A-3. CONDITIONING**

**A-3.1** Test specimens shall be conditioned in an atmosphere with a temperature of  $27 \pm 2^\circ\text{C}$  and  $65 \pm 5$  percent relative humidity for 24 hours.

**A-4. PROCEDURE****A-4.1 Test Specimen in Wire Cages**

**A-4.1.1** After conditioning weigh each test specimen to the nearest 0.001 g and determine its mean thickness to the nearest 0.01 mm.

**A-4.1.2** On the bottom of a metal container spread about 120  $\text{cm}^3$  of activated carbon. Place the test specimens into a small metal wire-mesh cage thus avoiding direct contact between the

plastic and the carbon. Finally put the lid on the container.

**A-4.1.3** Only test specimen of the same composition shall be placed in one container, in order to avoid the possibility of plasticizers or other components migrating from one specimen to another.

**A-4.1.4** Place the container in the oven or thermostatic bath controlled at a temperature of  $100 \pm 1^\circ\text{C}$ .

**A-4.1.5** After 24 h remove the container from the bath or oven and allow it to cool at room temperature. Remove the specimens from the container, carefully brush them free from any trace of carbon particles and recondition under the same conditions as those to which they were subjected before the original weighing.

**A-4.1.6** Reweigh each specimen to the nearest 0.001 g.

NOTE — For different materials, different temperature and durations of test may be agreed between the interested parties, maintaining the same test procedure.

**A-5. EXPRESSION OF RESULTS**

**A-5.1** The loss in mass,  $\Delta m$  expressed as a percentage, is given by the formula:

$$\Delta m = \frac{m_0 - m_1}{m_0} \times 100$$

where

$m_0$  is the mass, in grams, of the test specimen after conditioning;

$m_1$  is the mass, in grams, of the test specimen after treatment in the oven or thermostatical bath and reconditioning.

NOTE — The arithmetic mean of the values obtained from the three test specimens is the loss of plasticizers from the material under test.

**A-6. TEST REPORT**

The report shall include the following particulars:

- a) Reference to this Indian Standard;
- b) Complete identification of the sample and the procedure used for preparing the specimens;
- c) Thickness of each test specimen, to the nearest 0.01 mm;
- d) The mass of each test specimen, in grams, before the test and the gain or loss in mass, in milligrams, during the test;
- e) The mass change of each test specimen, expressed as a percentage of the original mass;
- f) The arithmetic mean of the values obtained from the three test specimens;
- g) Observations on any change in appearance of the test specimens; and
- h) Date of test.

\*Adopted from ISO 176 : 1976 Plastics — Determination of loss of plasticizers — Activated carbon method (Method B only).



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### Amendments Issued Since Publication

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